TERESA SHEWRY

Geologic Fictions: Science, Imperialism, and Transnational Literatures of Deep Time

In a poem titled "The Cloud Forest" (1995), David Eggleton, a New Zealand writer of European and Rotuman (Fijian) heritage, tracks the long migrations of a forest through time, from "Gondwanaland froglets" to the emergence of a "telecommunications rainforest," and finally to a logging camp (51). Gondwana (also known as Gondwanaland) is a southern hemispheric supercontinent that disintegrated millions of years ago.[1] It is a place of concern in the works of a number of contemporary writers who are engaged with difficult environmental and social contexts. Indian writer Mahasweta Devi repeatedly refers to Gondwanaland in her novella "Pterodactyl, Puran Sahay, and Pirtha" (1995), a story about tribal peoples struggling in conditions of social marginalization, drought, and water poisoned by green revolution fertilizers and the Bhopal catastrophe. Gondwana also appears in Australian writer Jill Jones's "Facing the Harbour: *Skeleton fork fern—Psilotum nudum*" (2005), a poem about the precarious survival of the Skeleton Fork Fern, the ancestors of which can be traced in relatively continuous form over hundreds of millions of years in Australia.

These writers are connected through their assertion of relationships to an ancient, rather than only a present, geographic configuration of the planet, to a continent that cannot be contained within any country or continent that exists now. They are also connected by the global-scale paleoscientific research projects in which Gondwana was made

Interdisciplinary Studies in Literature and Environment 21.2 (Spring 2014)
Advance Access publication July 7, 2014 doi:10.1093/isle/isu069
© The Author(s) 2014. Published by Oxford University Press on behalf of the Association for the Study of Literature and Environment. All rights reserved.
For Permissions, please email: journals.permissions@oup.com

imaginable. Gondwana is what historian Sumathi Ramaswamy calls a "*paleo* place-world": it is a lost place from a "time before our own" and it first took imaginative form in scientific fields such as geology, natural history, and prehistory (6). The name Gondwana was first used by scientists who were mapping coal resources in Madhya Pradesh as part of the Geological Survey of India. British colonial geologist Henry B. Medlicott wrote a report in 1872 calling some rock formations Gondwana after the Gonds, an indigenous people who lived in the area (Sorkhabi 82). In 1885, Austrian geologist Eduard Suess saw connections between rocks and fossilized flora in varied southern continental contexts and speculated that in the Mesozoic, these places were joined as an entity that he named Gondwanaland (Ramaswamy 242). In *Das Antlitz der Erde* (*The Face of the Earth*), Suess describes a region involving "the southern and a great deal of the more central part of Africa, then Madagascar and the Indian peninsular. [. . .] We call this mass Gondwána-Land, after the ancient Gondwána flora which is common to all its parts" (596). According to many contemporary scientific stories, Gondwana emerged about 170 million years ago (MYA) with the disintegration of the continent Pangaea, and fragmented into the proto-forms of present geographies, including Africa, Antarctica, Australia, India, New Zealand, and South America (Gibbs 49–50).

Today, some literary writers draw Gondwana into disparate stories about ecological crisis and social injustice in the present-day places that took form partly through the emergence and disintegration of the supercontinent millions of years ago. Their engagements with Gondwana do not simply reflect aesthetic or thematic choices but also colonial histories in which geological research accrued national as well as transnational significance.[2] A number of scholars have argued that scientific research and ways of reasoning be accorded an important, authoritative place within ecocritical understandings of the environment. Greg Garrard observes that "Ecocritics remain suspicious of the idea of science as wholly objective and value-free, but they are in the unusual position as cultural critics of having to defer, in the last analysis, to a scientific understanding of the world" (10). He positions relationships between the humanities and environmental sciences as a major future concern for ecocritics (178).

What might a relationship with science, particularly one framed in terms of deference, mean for intellectuals who are engaged with colonial histories in which scientific research was in varied ways involved in violence against colonized peoples and their territories? There could be no single response to this question, but many scholars in postcolonial and indigenous studies have approached science critically for its entanglements in colonial histories, militarism, and projects of

economic and social reconstruction such as the green revolution. For example, they have explored how colonial administrators and settlers mapped and claimed resources within the field of natural history and defined social hierarchies as science.[3] Among the legacies of these histories are maps that socio-geographically divide knowledge along fault lines such as truth and belief, the universal and the local, and the modern and the traditional. The "West," observes Celia Lowe, came to be widely imagined as a place of science, development, and modernity, and the "East" as the home of "belief and unreason" (11). Literary stories which romanticize indigenous peoples as living well in nature have accrued substantial attention in ecocriticism.[4] More powerful discourses in the British Empire involved un-romanticized condemnation of indigenous people's ways of knowing and living in their territories. Material infrastructures, such as schools, political and legal systems, and military campaigns, enforced European ways of seeing and relating to the world.[5] Indigenous groups still struggle for their right to relate to their lands and resources on their own terms, to "own and reconstruct these and yet to be imagined worlds again," as Jonathan Goldberg-Hiller and Noenoe K. Silva write of Native Hawaiian imaginings of pigs and sharks (444).

These concerns for owning and reconstructing material and imagined worlds do not necessarily mean an effort to reject knowledge defined as science. A number of scholars have recently explored the production and imagination of science in varied places internationally and transnationally, including in colonized or formerly colonized contexts. They examine inequalities in access to, and in the means of producing, scientific research, as well as tensions regarding how science is defined, its geo-social and cultural parameters, and control of its production and use.[6] Contemporary discussions about Gondwana likewise reflect the complex ways in which people may apprehend the socio-geographic and cultural significance of scientific research and of the material worlds taking imaginative form through it. In particular, Gondwana is often viewed as bearing profound significance for particular national communities, even though this continent existed within a "tectonic geography" different from today's political maps (O'Reilly 221). For example, Jessica O'Reilly observes that a delegate from India created disarray at the Antarctic Treaty Consultative Meetings in 2006 by announcing India's plans to place a new research station in the area where India and Antarctica were joined as part of Gondwana: "Because of this Indian relationship to this part of Antarctica, he explained, India has a 'scientific need' to build a research station at this site to study Indian–Antarctic geologic relationships" (215).

Literary archives are also a creative site where contemporary ecological and social concerns interact with the ancient geographies inhabited by Gondwana, as well as with historical and lived experiences of science. In this essay, I explore the meanings of this nonhuman and scientific heritage for a contemporary Aotearoa New Zealand writer, David Eggleton. In the poem "The Cloud Forest," Eggleton draws on Gondwana to illuminate ecological loss and to explore the meanings of sociality through a temporal rather than only spatial lens. Across the expanses of geological time, Eggleton can see how the life of the forest has changed and endured in relation to climate, land and ocean boundaries, and assemblages of species. While he creatively engages paleo-scientific stories, he threads these together with concerns for different ways of knowing the forest and its histories, specifically Māori ways of telling forest genealogy. Before turning to Eggleton, I illuminate a backdrop of nineteenth-century geology and its uptake in the poetry of settler writer Edward Tregear, as well as of geologic nationalisms in contemporary nonfiction environmental writings from New Zealand.

Migrating Stories: Geology and Empire

Contemporary writers' engagement with Gondwana can be traced, in part, to transnational, imperial spaces of nineteenth-century scientific research. Before the 1780s, many scientists thought that Earth was approximately 6000 years old (Ramaswamy 19). In the late eighteenth century, they were finding that Earth has changed dramatically and without cease over durations of time that are much deeper than they had previously recognized. They altered the temporal frameworks through which environments can be understood so greatly that today many scientists consider the planet to be about 4.6 billion years old (Gibbs 59).

These transformations in scientific imaginings of time coincided with the processes of European imperialism. Ideas about lost environments, creatures, and peoples of the deep past were created and circulated in scientific networks among colonized places. In her exploration of deep time frameworks in Amitav Ghosh's novel *The Hungry Tide* (2005), Rajender Kaur notes that such stretched time scales illuminate strange spatial arrangements that once existed on the planet and that might disturb sedimented nationalisms or other contemporary social divisions. She writes, "Deep time necessarily foregrounds a broader, overarching, biotic horizon that is rarely if ever mentioned in colonial discourse and against which postcolonial politics should be viewed" (127).

Early written archives from colonial New Zealand and Australia, however, show that scientists were much interested in establishing deep time perspectives on the environments and life forms of these places.[7] Robert A. Stafford writes:

> Like Australia, New Zealand fascinated European scientists as an evolutionary laboratory: its archaic fauna survived in a geologically active landscape dominated by vegetation reminiscent of the Carboniferous swamps being brought to light by palaeontologists and illustrated in popular texts such as *Siluria*. (55)

These ways of understanding the archipelago were made possible by the institution of the national geological survey. It was established in the UK in 1835 and soon expanded to colonial surveys in which scientists sought to understand geological history and the natural world, for example, to date rocks and fossils, and to map economically lucrative resources such as coal, ore, and gold (Stafford 24; Oldroyd 117). By 1855, the geological survey was a "national institution dedicated to the systematic mapping of the strata and economic minerals of Britain and Ireland, the development of imperial mineral resources, and the gathering of geological intelligence on a global scale" (Stafford 25). Ideas, objects, and the scientists themselves all traveled over borders in this transnational-scale research space. For example, C. A. Fleming details letter exchanges among early geologists working in New Zealand and Australia, outlining their discussions of resemblances between gold, rocks, and coal in the two colonies (264). These networks did not involve a free exchange or homogenization of ideas, practices, and objects, but rather unequal power among scientists and places. Stafford, for example, describes how Roderick Murchison, Director-General of the Geological Survey of the UK, sought to maintain authority over scientists and research produced in the colonies (34).

Some early literary writers in New Zealand incorporated the emerging deep time approaches to the environments in which they were living. Their writings reveal specific settler politics in New Zealand, rather than globally homogenous imaginaries emerging from geological research. Edward Tregear's "Te Whetu Plains," a poem written in 1872 or 1873, first published in 1919 in *Shadows and Other Verses*, and influential in New Zealand literary studies, is one of the most striking engagements with geologic time in colonial New Zealand literature (Howe, "The Dating" 55). Tregear was born in Southampton, England, in 1846, and arrived in New Zealand in 1863. He is well known as an intellectual and writer, as well as for political

work as Secretary of the Department of Labour (Howe *Singer* 9). From 1872 to 1873, Tregear worked for the Land Purchase Department as a surveyor of Māori land (Howe *Singer* 18). He visited areas little explored by Europeans, interacted with Māori communities, and learned to speak Māori (Howe, *Singer* 16–21).

In "Te Whetu Plains," Tregear draws on scientific ideas about the vast age of the planet and its violent pathways across time in a way that imaginatively displaces more recent environmental and social change. At Te Whetu, between Rotorua and Tokoroa in the North Island, Tregear was confronted with "gloomy forests, swamp lands, and barren volcanic plateaux" that were "utterly devoid both physically and spiritually of any elements of his European cultural heritage" (Howe, *Singer* 19). Tregear opens the poem by describing the plains as frightening and isolating. A "lonely rock" sits above the plateau, while below are "blackened swamps," places of the "ghostly silken flags of seeding water-sedges" (97). The environment is bleak and desolate: the grass is "wan, and grey, and pale" (97). The plants are haunting, while the plains are silent. This is a place that seems devoid of life. It is "a songless land" without "music of the nightingale" (97).

New Zealand literary writer and cultural critic Ian Wedde notes that Tregear emphasizes what the plains *are not* through many negative phrases: it is "a language that subtracts rather than names, that reveals Tregear's alienation" (32). The blackened swamp, silent forest, missing birds, and haunting plants also evoke the unimaginably rapid environmental transformations that attended European settlement of New Zealand. Geoff Park describes how settlers comprehensively removed forests and wetlands, particularly from the plains: "When the smoke of their colonists' fires cleared at the end of the 19th century, New Zealand had become a different country. Māori had lost their most precious life-support system. Only in the hilliest places did the forest still come down to the sea. Huge slices of the ancient ecosystem were missing, evicted and extinguished" (*Ngā Uruora* 13). What unfolded was a "total, deliberate extermination [of life] from New Zealand's plains" (*Ngā Uruora* 13). The barren, silent, and blackened landscape of Tregear's "Te Whetu Plains" correlates with Park's description of the burnt and species-diminished environments that were rapidly transformed by colonists' axes and fires. But Tregear also leaves out the "intimate and highly deliberate connection" which by then had evolved between Māori and such environments (Park, *Ngā Uruora* 46). He does not reference Māori claims on the area, or activities such as cultivation of plants and burning or preservation of forest.[8] "They [Māori] claim and exercise ownership over the whole surface of the country, and there is no part of it, however lonely, of

which they do not know the owners. Forests in the wildest part of the country have their claimants . . . Forests are preserved for birds; swamps and streams for eel-weirs and fisheries," William Swainson writes in 1859 (qtd. in Park, *Ngā Uruora* 40). The loss of forest territories has meant immense hardship for a number of different Māori groups.[9]

In later correspondence, written from 1895 onwards, Tregear comments critically on European settlers' efforts to destroy the forest, as well as on unjust methods by which a wealthy settler, Walter Buller, acquired Māori land (Park, *Ngā Uruora* 201–03). In "Te Whetu Plains," however, Tregear does not engage Māori or settler relationships with the land, forests, and swamplands. Instead, he provides a deep time explanation for the desolation of the plains. When the earth was in its "infancy," he writes, the rock (which now sits above the plains) was "hurled/And tost on waves of flames" (97). After upheavals, involving fire, lightening, heat, and "blasts of steam and vapour," a million years went by "and left strange quiet here" (97). A "ghastly peace" ensued, one that reminds the narrator of his impending death (98). Tregear understands the chilling "peace" in this place in terms of the violent upheavals of Earth, and indeed the universe, through geologic time, rather than through an engagement with the colonial and capitalist environments of war, land appropriation, deforestation, and wetland-draining. As critics have noted, deep time perspectives on environmental and social change may in this way erase human actions, such as the material practices and ecological transformations instituted under colonialism and capitalism.[10]

Geologic Time in Stories of Ecological Loss

Profound traces of these scientific, colonial labors, which first gave Gondwana imaginative importance, can be found on much New Zealand European writing about the environment today. Many environmental writers from New Zealand concentrate, in part, on the archipelago's relationship to Earth at different time scale than that of the present—that of Gondwana, from which a proto-form of New Zealand broke away about 80 MYA. In *Ghosts of Gondwana: The History of Life in New Zealand* (2006), biologist George Gibbs outlines the long processes through which Gondwana emerged and disintegrated, the ensuing formation of new, smaller continental entities, and the processes of rifting, sinking, and break up as New Zealand took its current shape. "For our interpretations of the origin of New Zealand and its life," he writes, "we must think in terms of these maps of the past, not the ones we use today" (53).

New Zealand European environmental writers commonly describe strange plants and animals who survived in somewhat continuous form over millions of years through the migrations of continents, climatic alterations, and reconfigurations of land and water boundaries. Eventually isolated by water from all other life on the planet, these plants and animals transformed into entities seen nowhere else and yet that maintain substantial connections with their Gondwanan ancestors. Gibbs, for example, writes that Gondwana's life has left traces on New Zealand's native frogs, which are "relicts of a more widespread group, the Leiopelmatidae, that probably occurred across Gondwana 100–180 MYA but have since become extinct everywhere except in New Zealand" (17). On the first page of *Ngā Uruora—The Groves of Life: Ecology and History in a New Zealand Landscape*, ecologist Geoff Park refers to Gondwanan plants and animals who have been "preserved" in the New Zealand archipelago (13). The native trees kohekohe, titoki, and tawa are "time-travellers from the ancient Gondwana tropics" (*Ngā Uruora* 176).

Park and Gibbs take stories of geologic time in different directions than Tregear, entangling Gondwana with concern regarding the ecological loss that has ensued in colonialism and in the capitalist economy. The life forms that seep over the fissure between the Gondwanan world and the present world intensify these writers' expressions of sorrow about recent environmental change. In *Ghosts of Gondwana*, Gibbs describes a group of tiny wrens, some flightless, all but two now extinct. The last flightless wren, Stephens Island wren, lived until around 1895. Gibbs includes a 1964 photograph of its relative, the Bush wren, noting that it is the only color photograph ever taken of it and that it too is extinct. These wrens may have represented "the closest surviving relict of the ancestral type of passerine bird" from eastern Gondwana (16). For Gibbs, the wrens are stretched across the abyss of time between the present and Gondwana, representing continuity. He does not frame his work simply as an excavation back through time but rather as a way of seeing the living as stretched across the immense temporal spans of the planet. A creature like the Bush wren is particularly precious for Gibbs because it maintains continuity with Gondwana, representing the wonder, creativity, and resilience of life shaped across all that time. In contrast, its destruction in the twentieth century was breathtakingly rapid, and by implication, reckless. He values endurance, conceived not on the basis of an individual life but in terms of a collective of beings, within which individuals are constantly emerging, embodying change, and disappearing, and yet where substantial, traceable connections are maintained among all the beings across time.

The Bush wren is also precious because there is a geologic nationalism at work in many New Zealand stories of Gondwana.[11] Writers often give a nationalistic twist to deep environmental history, emphasizing the distinctive pathways that Gondwana life forms took after the continent's disintegration and noting that New Zealand is home to the only survivors of some Gondwanan families. Gibbs writes: "We know that a group of smallish, lizard-like reptiles (Order Sphenodontia) roamed the globe during the age of dinosaurs. Now, the tuatara is the only type of sphenodontid reptile to survive—and it does so only in New Zealand" (14). These nationalist stories emphasize the strangeness of the indigenous animals and plants inhabiting New Zealand, which is home to "some of the world's oldest and oddest life" (Park, *Ngā Uruora* 13). One might think that Gondwana would resist nationalistic framings of space and sociality, since it supported relationships among beings and places that still exist and that run over national borders. Some of New Zealand's indigenous life forms are ancestrally connected to life forms from other fragments of Gondwana. For example, a family of beech forest beetles, thought to be endemic to New Zealand, has recently also been found in Chile (Gibbs 18). Engagement with Gondwana brings to light extra-national spaces of relationality, suggesting that the ecological and geologic arrangements often claimed to be structuring national borders in certain ways exceed these borders. New Zealand European writers have long cultivated notions of a unique, national nature, but are increasingly coming to acknowledge such spatial-social complexities.

Some contemporary environmental writers therefore reverse Tregear's way of using geologic time, which involved disengagement from settler colonialism and its attendant environmental upheaval. Informed by their scientific backgrounds, they draw on the worlds and life forms of geologic time to illuminate environmental loss. Geological research also continues to provide an imaginatively appealing space of engagement for some literary writers today. For David Eggleton, in the poem "The Cloud Forest," published in *Empty Orchestra*, such scientific heritage provides useful ways to see agents which have shaped life through time, such as climate, water, and multiplicities of life forms, as well as to apprehend their importance to our life at a time when we are changing them. But for Eggleton, there is much in this landscape and its history that paleoscientific stories cannot understand. For example, they cannot understand the meaning of what he finds in the land in a poem that follows two pages on from "The Cloud Forest," titled "Ruaumoko":

> Intricate rainshadow with a rich culture buried underneath. Birdbone. Whalebone. Kauri resin ash staining blue. Bones anointed with oil and red ochre. Wraiths in the mist-wreathed valleys. Curve of eel. Raw welts dripping red. Albatross. Chevrons, crescents, circles, ellipses, diamonds. Te Kooti.

> Swirling rivers. A froth-mound. Otumatua Pa. Apuku fishing ground. Greenstone river. (53)

Rethinking Geologic Sociality

David Eggleton is a poet of Polynesian (Fijian) and European heritage, who was born in New Zealand in 1953. He is well known in New Zealand as a performance poet and for cutting social and economic critique: "Cultural identity of this country," he writes in a poem titled "Don't Rewind," "is manifesting a split personality, / carnivorous, predatory, no social equity" (14). In *Empty Orchestra*, Eggleton explores the "landscape we invent, as it invents us," as he puts it in "Waipounamu: The Lakes District," particularly focusing on consumer and media culture, militarism, tourism, and unjust and unsustainable economic practices and policies (85).

"The Cloud Forest" is a poem about the genealogies of a forest, beginning with the emergence of Gondwanan life forms from an ice-age and moving through to present-day New Zealand, a setting that Eggleton emphasizes through references to native plants and birds: pōhutukawa, kākā, kōkako, kahikatea, kānuka.

> Tribes of glassblowers have lived here, engraving the canopy,
> since glass tadpoles first shattered
> into Gondwanaland froglets and glacier cocoons were sawn through,
> plankton-green, like the interior chrysalis of a capsized iceberg. (51)

The beings of the forest shape the nectar of the pōhutukawa tree into bush orchids and puffball fungi, then further into vases, bowls, and fiber-optic cables. A "telecommunications rainforest" emerges, home to the kōkako, a wattlebird, and to the kākā, a parrot (51). Botanists take apart and reconfigure the forest in their search for the tree genome. The poem ends when a logging camp is set up and the remainders of the forest are dispersed into museums, reserves, and florist shops.

The history of the forest has always involved complex interactions between emergence, transformation, disappearance, and endurance, but Eggleton emphasizes that the forest has recently become a site of particular, intensive processes of loss in the capitalist economy. Many forest entities have been turned into settlers' butterboxes and vases, among other products. The living creatures of the forest are also struggling, particularly the native birds. Eggleton references the kōkako, an endemic wattlebird. The kōkako population has fallen dramatically since the turn of the twentieth century because of habitat clearance and the introduction of species such as stoats and possums. Less than 400 breeding pairs of kōkako remain in the North Island, while the

South Island subspecies is likely extinct (Department of Conservation). Today, kōkako are intensively managed for survival. For example, they are fitted with transmitters for monitoring and introduced to protected offshore islands (Department of Conservation). Eggleton situates the song of the kōkako in "a telecommunications rainforest," where there are "deep satellite footprints," pointing to technological maintenance of the threatened bird and its habitat (51). He perhaps also observes that most people living today can only listen to the kōkako through recordings of its calls.

Eggleton draws on geologic time in this poem about ecological loss so as to more sharply portray the crisis meant by the present-day destruction of species and the forest. Across these stretches of time, immense changes to climate, land–water relationships, and species assemblages, through which the forest has survived and transformed, become visible. Eggleton describes the early history of the forest as involving aquatic life forms, which emerge from a protective world of ice: "glass tadpoles" emerged as "glacier cocoons" were "sawn through," and were "like the interior chrysalis of a capsized iceberg" (51). Eggleton's forest moves from these ice-wrapped conditions to the tropical world of Gondwana and then to the temperate climate of New Zealand. He begins the poem with a "cloud forest," but later shifts in terminology to "rainforest" (51). The term cloud forest evokes the tropical ecosystems of Gondwana, which migrated through different climatic and ecological conditions, both across time and spatially to the south, becoming the rainforest which today exists in the cool, temperate climate of New Zealand (Park, *Ngā Uruora* 37, 121).

Eggleton links these past climatic changes to changes in the life of the forest. He describes the first forest creatures as tadpoles and froglets, evoking the forest ecosystem's early connections to water, and later observes the emergence of terrestrial life forms such as bush orchids and puffball fungi (51). Across long durations, it becomes clear that today's environments and assemblages of life forms have been shaped by restless interactions between water and land on the planet. For example, the deserts of southwestern Peru are filled with the markers of a time of alternative oceanic boundaries on Earth: they were recently described in the media as "a graveyard of marine animals from the past 40 million years" (Carroll D1). A huge upturned fossil coral reef was found far inland in outback Australia and is thought to have been alive 650 MYA when eastern Australia was under water (Catchpole). In "The Cloud Forest," Eggleton maps how life has changed with the emergence and retreat of glaciers, an oceanic or aquatic ecosystem, and a tropical and then a temperate terrestrial environment. In exploring how the forest has transformed and

survived over time in relation to the climate, Eggleton perhaps asks us to reflect on the implications for human and other life of contemporary processes of anthropogenic extinction and climate change. Dipesh Chakrabarty argues that within a geologic time frame, certain conditions come into focus as parameters on forms of human life such as agriculture and writing. These conditions include the temperature zone in which Earth exists and the interactive dynamics of species: "Unfortunately, we have now ourselves become a geological agent disturbing these parametric conditions needed for our own existence" (218).

While Eggleton draws on paleo-scientific research to illuminate ecological crisis, his engagement with Gondwana is also marked by different ways of knowing the environment. Contemporary nonfiction writers often suggest that only some creatures have maintained connections to Gondwana through time; not all life forms are descendants of Gondwana and its life. Eggleton, in contrast, includes humans among a multitude of entities genealogically linked to the Gondwanan forest. His "family trees" of the forest include any life which transformed and was in some way supported by the forest (51). Gondwanan froglets, pōhutukawa trees, bush orchids, vases, butterdishes, fiber-optic cables, as well as botanists all form part of the forest's genealogies. In emphasizing that all these beings and entities have descended, in part, from the forest, Eggleton challenges views of the forest as a remote entity set apart from modern life. As Geoff Park notes, Europeans commonly represented Polynesian forests as evil spaces opposed to civilization: "wherever Christian missionaries went, the forest became a negative force" (149). New Zealand ethnologist Eldson Best wrote in 1907: "The forest is conservative, repressive, making not for culture or advancement. None of the higher types of civilisation of antiquity originated in forest lands. Primitive man remains primitive in sylvan solitudes" (qtd. in Park 131).

Eggleton's alternative forest genealogy might be understood as engaging Māori and more broadly Polynesian thought, which is not homogenous but generally does not separate humans from the natural world and emphasizes relationships among all things, including ancestral ties between people and the forest. Rāwiri Taonui writes, "In Māori tradition, people and forests are vitally connected—both were created by the god Tāne" (n.p.). Eggleton uses the term "Tribes of glassblowers" to characterize the creativity and artistry of all life associated with the forest (51). He places the emergence of pōhutukawa nectar, a telecommunications rainforest, and fiber-optic cables in the same sentence, emphasizing there is no absolute spatial or temporal

disjuncture between human and nonhuman creativity in relation to the forest.

Such enduring creativity is marked in the form of "The Cloud Forest," which is not divided into stanzas, evoking the survival of the forest from Gondwana to present day. When Eggleton uses full stops, he emphasizes thematic continuities that cross them. A fern frond is composed of "damp brown hairs slicked and combed over into a caul. / It sprouts on the end of a stem" (51). The frond has a relatively distinct, stable form, and yet it spatially and temporally connects with other beings and transforms. Eggleton marks the eventual destruction of the forest with a full stop: "a logging camp takes root" (51). He likens the camp to a tree because it is supported by the forest. It does not in turn nourish the forest, however. It positions the forest as a commodity to be exhausted. The logging camp marks the end of the varied, artistic entities that for millennia have constantly shaped forest life.

> The jewellery remnants of depleted forest histories
> are placed in scenic reserves—
> a settlers' museum of kahikatea butterboxes,
> a florist's shop-window of white kanuka in November. (51)

The dash indicates that the remainders of the forest are set aside in space, disrupting the fluid downwards trajectory of the aesthetic of the poem and its representation of endurance. The scenic reserves, settlers' museums, and displays of kanuka in florist-shops are all possible ways of remembering the history of the forest. But they are also images of containment and setting aside of the histories of forests, associated with the colonial institutions of the museum and conservation, and with the capitalist economy. For Eggleton, telling a story of the deep history of the forest may have a different potential, to illuminate the remaining entities and beings of the forest which are situated on the threshold of survival and extinction. In this poem which stretches so far back into the past, Eggleton's main concern is to formulate the question of what the still-living remnants of the forest could mean to the present world and to its futures.

Conclusion: Forest Futures

For almost as long as scientists have been unearthing stories of deep time—in which continental plates wander, the sea flows upwards to inundate land-masses, ice arcs out across continents and ocean—their work has appealed to the imaginative and political interests of literary writers. Gondwana's presence in varied contemporary literatures from places of the British Empire does not only reveal the

wonder of the nonhuman places and life forms of geologic time, however. It also draws us toward the social and imaginative worlds of colonial projects, their injustices, and their continued legacies. For writers working in the aftermath of colonialism such legacies may be more haunting than Gondwana. Australian historian Tom Griffiths writes of nationalistic stories about Gondwana, "non-Aboriginal Australians have to ask themselves if this is yet another act of appropriation? Have settler Australians yet earned the right to travel in deep time in their own country?" (Griffiths).

I have suggested in this essay that asking such questions does not always mean undermining or rejecting stories about Gondwana. In "The Cloud Forest," Eggleton negotiates the relevance of scientists' accounts of paleo-climates, continents, and forests, but also frames the story of the Gondwanan forest through different ways of reasoning about the forest. Within a geologic time frame, he imagines survival in a way that recognizes the importance of the climate and the ocean to the present world. But for Eggleton, such an account of the forest could never fully capture its histories, lived realities, or meanings. "The Cloud Forest" draws on indigenous ways of telling genealogy that connect people and forest, situating people and their artistry as part of the life and ancestry of the forest. This enables Eggleton to more sharply engage the reality of the forest in its entanglements with people, technologies, and economy. It also emphasizes the right of the communities from whom the forest was appropriated to practice their distinctive ways of being in and imagining the forest.

Concern regarding how knowledge defined as science has been used to undermine Māori thought marks some contemporary nonfiction environmental writing in New Zealand. Perhaps the most striking among these writings is Geoff Park's *Ngā Uruora: Ecology and History in a New Zealand Landscape*. In this book, Park describes his search for the survivors of European settler's efforts to eliminate floodplain forests and swamps. Park was an ecologist engaged with Māori thought and aware of the "persistent imperialism of the natural science on which I was brought up" (*Ngā Uruora* 123). He draws heavily on geological perspectives on New Zealand environments in *Ngā Uruora*, but situates them in terms of their limitations and for the ways in which they may elide other ways of seeing the landscape. While reflecting on a kahikatea forest, "barely changed since dinosaurs knew it" and which "makes human time seem like dust on a rock," he spots a midden in the bank of a river, a rubbish heap where a Māori community once discarded hundreds of sea shells (121). "Just when I was trying to connect with a peopleless world, millions of years in the making," he writes, "the shell mound made it satisfyingly human" (123). The midden, as

well as early European paintings of Māori settlements in forest areas, suggests that a Māori group could have lived here permanently and have allowed the kahikatea forest to remain intact. But natural science, he writes, has preferred to undermine such evidence, in a homogenizing and imperialistic way positioning Māori as destroyers of primeval forests and bird life (123).

Projects such as *Ngā Uruora* and "The Cloud Forest" do not conflate but rather grapple with how different approaches to the environment might co-exist, sometimes in ways that are co-operative or creative, always marked by concerns regarding the injustices that mark their interactions. They do not attempt to seamlessly combine or to overcome different forest imaginaries. They work to reveal awkward and persistent realities of tenuous intersection, marginalization, and difference among ways of reasoning about the forest. For example, Eggleton connects the forest and people genealogically in "The Cloud Forest," a way of telling genealogy which engages Māori or more broadly Polynesian modes of thinking and being, and which is dominant in the account of the forest in the poem, but he draws us back to Gondwana and not to Tāne. Eggleton and Park, among others, seek to make such troubled negotiations of ways of knowing the forest—directed at supporting the forest to survive and at recognizing the enduring colonial injustices that shape its imaginative and material life—part of its as-yet-unfinished histories.[12]

Notes

1. The name of the continent is a matter of debate. While the continent was first given the name Gondwanaland, some scholars later began to use Gondwana after mistakenly believing that Gondwana etymologically means "Land of the Gonds," making the term "land" in Gondwanaland redundant (Sorkhabi 82). I use the simpler term Gondwana in this essay, following New Zealand ecologist Geoff Park and biologist George Gibbs.

2. As Sumathi Ramaswamy writes of imaginings of Lemuria—a now discredited continent first dreamed up in the paleosciences and taken up by varied social groups, including by the Tamil people—such imaginings suggest "the numerous contradictions and conflicted intimacies of power, contestation, and resistance in an age dominated by capitalism, imperialism, and the postcolonial condition" (5).

3. Elizabeth DeLoughrey and George B. Handley traverse some of this territory in their introduction to *Postcolonial Ecologies: Literatures of the Environment* (11-12).

4. For an overview of "ecological Indian" stories, see Greg Garrard (120-35).

5. See, for example, Charles Darwin's discussion of Māori and European relationships with the environments of New Zealand in *The Voyage of the Beagle* (Darwin).

6. Writing of conservation biologists in Indonesia, for example, Celia Lowe observes that many EuroAmericans held powerful positions in science in the global South until the early 1990s. Elite Indonesian scientists now tend to occupy such positions and the state closely controls and restricts foreign scientists who want to work in the archipelago (5; 42). Lowe argues that "nature-making in the global South has been productive of the very form that has come to be known as biodiversity" (14).

7. Geological research was also a concern of Europeans in earlier visits to the Pacific, including during the voyage of James Cook and Joseph Banks from 1768–1771 (Stafford 33).

8. For discussions of some of the ways in which Māori historically altered the ecology of Aotearoa, see Park (*Ngā Uruora*), and Young (37-56).

9. See, for example, the Waitangi Tribunal's report on the impacts on the iwi or tribe Te Roroa of the loss of management of, and access to, Waipoua kauri forest (Waitangi Tribunal).

10. Stefan Helmreich, for example, writes of how scientists at a conference immediately after the 2004 Indian Ocean tsunami understood the tsunami through reference to the geologic time scale, creating a sense of relatively stable or continuous forces of nature in which human activities disappeared (Helmreich).

11. Scholars have also observed such geologic nationalisms in relation to Australia and India. Tom Griffiths writes of Australian writing and research: 'We now have our own deep past of innovative modern humanity, our own rainforests, our own dinosaurs, our own geological genesis with a magical name, *Gondwana*, and our own natural and cultural vestiges and relics to compete with those of the Old World' (Griffiths). Jessica O'Reilly discusses how Gondwana and nationalistic imaginaries became linked in the context of a planned Indian research scientific base in Antarctica (O'Reilly).

12. I would like to thank Sharae Deckard for helpful feedback on this essay.

Works Cited

Carroll, Sean B. "In a Shark's Tooth, a New Family Tree." *The New York Times*, 15 Sep. 2009: D1. Web. 25 July 2012.

Catchpole, Heather. "Fossil Reef Found in Aussie Outback." *ABC Science*, 22 Sep. 2008. Web. 25 July 2012.

Chakrabarty, Dipesh. "The Climate of History: Four Theses." *Critical Inquiry* 35 (Winter 2009): 197–222. Web. 25 July 2012.

Darwin, Charles. *The Voyage of the Beagle: Charles Darwin's* Journal of Research. 1839. Seattle: Pacific Publishing Studio, 2010.

DeLoughrey, Elizabeth and George B. Handley. "Introduction: Toward an Aesthetics of the Earth." *Postcolonial Ecologies: Literatures of the Environment*. Oxford: Oxford UP, 2011. 3–39. Print.

Department of Conservation—Te Papa Atawhai. "Kōkako." Department of Conservation—Te Papa Atawhai Website, n.d. Web. 25 July 2012.

Devi, Mahasweta. "Pterodactyl, Puran Sahay, and Pirtha." *Imaginary Maps: Three Stories by Mahasweta Devi*. Trans. Gayatri Chakravorty Spivak. New York: Routledge, 1995. 95–196. Print.

Eggleton, David. "The Cloud Forest." *Empty Orchestra*. Auckland: Auckland UP, 1995a. 51. Print.

——. "Don't Rewind." *Empty Orchestra*. Auckland: Auckland UP, 1995b. 14–15. Print.

——. "Ruaumoko." *Empty Orchestra*. Auckland: Auckland UP, 1995c. 53–56. Print.

——. "Waipounamu: The Lakes District." *Empty Orchestra*. Auckland: Auckland UP, 1995d. 82–85. Print.

Fleming, C. A. "Some Nineteenth Century Trans-Tasman Influences in Geology." *Australian Journal of Earth Sciences* 34.2 (1987): 261–77. Web. 25 July 2012.

Garrard, Greg. *Ecocriticism*. London: Routledge, 2004. Print.

Gibbs, George. *Ghosts of Gondwana: The History of Life in New Zealand*. Nelson: Craig Potton Publishing, 2006. Print.

Goldberg-Hiller, Jonathan and Noenoe K. Silva. "Sharks and Pigs: Animating Hawaiian Sovereignty against the Anthropological Machine." *The South Atlantic Quarterly* 110.2 (Spring 2011): 429–446. Web. 25 July 2012.

Griffiths, Tom. "Travelling in Deep Time: *La Longue Durée* in Australian History." *Australian Humanities Review* 18 (2000): n.p. Web. 25 July 2012.

Helmreich, Stefan. "Time and the Tsunami." *Reconstruction* 6.3 (Summer 2006): n.p. Web. 25 July 2012.

Howe, K. R. "The Dating of Edward Tregear's 'Te Whetu Plains', and an Unpublished Companion Poem." *Journal of New Zealand Literature* 5 (1987): 55–60. Web. 25 July 2012.

Howe, K. R. Singer in a Songless Land: A Life of Edward Tregear, *1846–1931*. Auckland: Auckland UP, 1991. Print.

Jones, Jill. "Facing the Harbour: *Skeleton fork fern—Psilotum nudum*." *Broken/Open*. Cambridge: Salt Publishing, 2005. 5. Print.

Kaur, Rajender. "'Home Is Where the Oracella Are': Toward a New Paradigm of Transcultural Ecocritical Engagement in Amitav Ghosh's *The Hungry Tide*." *Interdisciplinary Studies in Literature and Environment* 14.1 (2007): 125–41. Print.

Lowe, Celia. *Wild Profusion: Biodiversity Conservation in an Indonesian Archipelago*. Princeton: Princeton UP, 2006. Print.

Oldroyd, David. *Thinking about the Earth: A History of Ideas in Geology*. London: The Athlone P, 1996. Print.

O'Reilly, Jessica. "Tectonic History and Gondwanan Geopolitics in the Larsemann Hills, Antarctica." *Political and Legal Anthropology Review* 34.2 (2011): 214–32. Web. 25 July 2012.

Park, Geoff. "The Polynesian Forest: Customs and Conservation of Biological Diversity." *Science of Pacific Island Peoples* 2 (1994): 131–54. Print.

——. Ngā Uruora—The Groves of Life: Ecology and History in a New Zealand Landscape. Wellington: Victoria UP, 1995. Print.

Ramaswamy, Sumathi. *The Lost Land of Lemuria: Fabulous Geographies, Catastrophic Histories*. Berkeley: U of California P, 2004. Print.

Sorkhabi, Rasoul B. "What's in a Name—'Gondwana' or 'Gondwanaland'?" *Episodes: Journal of International Geoscience* 19.3 (1996): 82–84. Web. 25 July 2012.

Stafford, Robert A. *Scientist of Empire: Sir Roderick Murchison, Scientific Exploration & Victorian Imperialism.* Cambridge: Cambridge UP, 1989. Print.

Suess, Eduard. The Face of the Earth (Das Antlitz Der Erde): Vol. 1. *1885*. Trans. Hertha B. C. Sollas. Oxford: The Clarendon P, 1904. Print.

Taonui, Rāwiri. "Te Ngahere—Forest Lore." Te Ara—The Encyclopedia of New Zealand (2009). Web. 25 July 2012.

Tregear, Edward. "Te Whetu Plains." *1919.* The Penguin Book of New Zealand Verse. Ed. Ian Wedde and Harvey McQueen. Auckland: Penguin, 1985. 97–98. Print.

Waitangi, Tribunal. *The Te Roroa Report 1992. Waitangi Tribunal Te Rōpū Whakamana I Te Tiriti O Waitangi*. 1992. Web. 25 July 2012.

Wedde, Ian. "Introduction." *The Penguin Book of New Zealand Verse*. Ed. Ian Wedde and Harvey McQueen. Auckland: Penguin, 1985. 23–52. Print.